

Title:

Use of UAV to Evaluate Revegetation Success at a Hardrock Mine Superfund Site, Colorado

Authors:

Chris Rice, SolSpec Solutions, 4626 Weld County Road 65, Keenesburg, CO 80643,
crice@solspec.solutions,

Toby Kraft, SolSpec Solutions, 4626 Weld County Road 65, Keenesburg, CO 80643,
tkraft@solspec.solutions, 585.217.2342

Judy Daniels, SolSpec Solutions, 4626 Weld County Road 65, Keenesburg, CO 80643,
jdaniels@solspec.solutions, 585.217.2342

Andrew Harley, Duraroot Environmental Consulting, 4626 Weld County Road 65, Keenesburg,
CO 80643, aharley@duraroot.com, 720.840.4703

Topic:

Technology – UAV usages in AML activities

Abstract:

The Summitville Mine Superfund Site (SMSS) is a former 1400-acre open pit gold, copper and silver mine. The SMSS occupies a large expanse of alpine tundra and access is particularly difficult due to location within the Rio Grande National Forest within the San Juan Mountains of Southwest Colorado, its elevation of approximately 11,500 feet, and its area. Since 1992, the SMSS has undergone significant restoration and revegetation of mineralized parent material with the goal of establishing an ecologically productive and self-sustaining plant community to provide erosion control and reduce contaminant flow to groundwater.

Following site wide revegetation in 1999-2001, periodic monitoring using traditional point-intercept observations has been undertaken to provide a basis for determining reclamation success and identifying areas requiring maintenance work. Vegetation cover and an increase in species richness were used as measures of plant community development.

A periodic monitoring event undertaken in August 2017 included use of an Unmanned Aerial Vehicles (UAV). The UAV collected orthorectified images, digital elevation data, and IR vegetation images using a high-resolution IR and RGB cameras of the 1400-acre site. Survey grade ground control points were used to increase the precision and accuracy of these geospatial data sets. Statistical and spatial analysis was performed to evaluate the spatial distribution of the

vegetative cover at multiple landscape scales; broad (ecosystem), mid (community compositions), and fine (species composition). These results will be used to establish a reporting strategy for long-term monitoring, allowing for recommendations that will improve site stability while reducing the cost of monitoring.